Yukon-Kuskokwim Delta

Transportation Plan

Summary

An Element of the
Alaska Statewide Transportation Plan

Alaska Department of Transportation
and Public Facilities
March 2002

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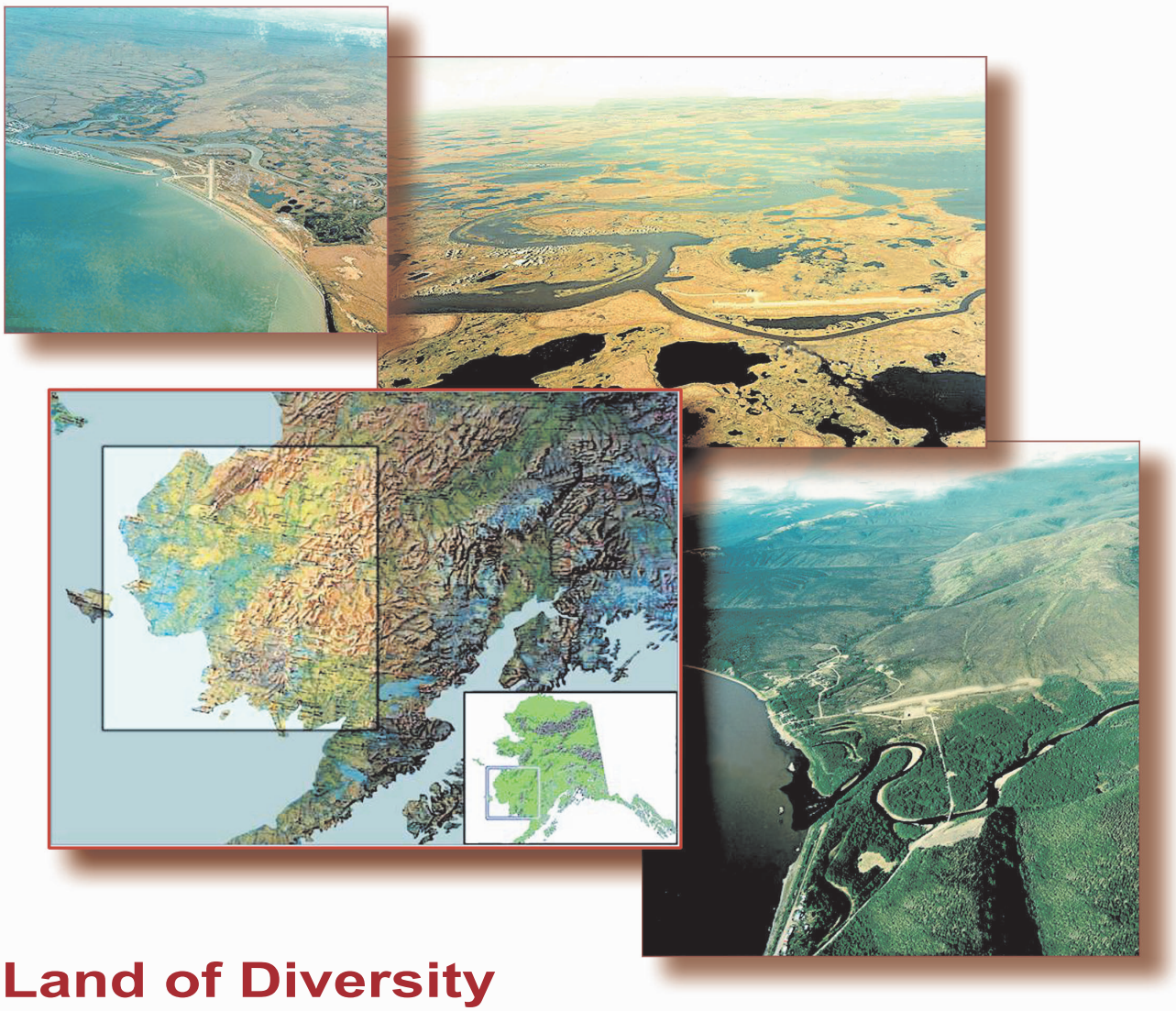
Yukon-Kuskokwim Delta Region



A Land of Diversity

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Clockwise from Top Left:

Coastal Village, Tununak (www.alaska.faa.gov/flytoak/data/region.idc; (FAA, Alaska Region)

Tundra Village, Nunapitchuk (FAA, Alaska Region)

Upriver Village, Crooked Creek (FAA Alaska Region)

Regional Map (AK DOT&PF)

Cover:

Bethel Camai Girl (Alaska DCED, Community Database Online, www.dced.state.ak.us/mra/CF_PhotoIndex.cfm; DCED)

Back:

Courtesy Alaska Museum of History and Art

March 2002

Yukon-Kuskokwim Delta Transportation Plan Summary

Introduction

Department of Transportation and Public Facilities (DOT&PF) staff and project consultants worked with Yukon–Kuskokwim (Y-K) Delta villages, businesses, and an Advisory Committee of regional leaders over the last three years to analyze the region's transportation networks and determine future demand on the networks. The planning team also examined alternatives to the existing systems, including highway and railroad routes from interior Alaska to Bethel. Small populations in the region and relatively low freight volumes combined with long distances to the state's rail and highway connections and challenging construction conditions to make these alternatives impractical within the Y-K Delta Plan's 20-year horizon.

The goals developed during the planning process are:

- Identify basic transportation projects that improve safety and enhance quality of life for the region's 25,000+ residents
- Identify basic transportation infrastructure needed to support economic development opportunities

The resulting Y-K Delta Transportation Plan (Y-K Delta Plan) describes the region's transportation system, its immediate infrastructure needs, and the capital projects needed to meet future transportation demand and strengthen the region's economy.

This Summary is one of three documents that make up the Y-K Delta Plan. Its purpose is to provide an overview of the plan's findings and conclusions. It serves as a general distribution product for public and DOT&PF staff use. It illustrates the specific aviation, winter trail, and road projects DOT&PF has direct responsibility for and outlines projects brought forward in the planning process that may be pursued by other funding sources.

The other documents are the full text of the plan and a set of appendices that support the plan. The full text details the findings and conclusions presented in the Summary. The plan document also includes detailed information on the region's economy, social structure, and demographics. It explains how population and demographic analysis models and transportation system models used to project demand were developed. The plan presents modal chapters on existing aviation, marine, and overland transport systems and the capital and operating improvements needed to meet projected demand.

The appendices include the full documentation of analyses that were used to prepare the plan. This information is useful for future research on transportation in the Y-K Delta and other rural areas of the state.

Figure 1 Subsistence Activity in Alakanuk (DCED)

Figure 2 Aerial View of Red Devil (FAA, Alaska Region)

Figure 3 Boardwalk in Nunam Iqua (DCED)

Many transportation improvement projects identified in the analysis phase of this plan have been included in the department's State Transportation Improvement Program (STIP) and Airport Improvement Program (AIP). The remaining projects outlined in the plan will be incorporated into capital project programs as funding becomes available.

Figure 4 Transportation in the Y-K Delta (DCED)

About the Region

The land status in the study area is illustrated in Figure 8. National Wildlife Refuge lands and other federal lands cover a very large proportion of the region's coastal and tundra areas. The State of Alaska and the region's Native Corporations are major landowners in the mineral-rich inland areas.

Almost 85% of the 25,000+ (1999 census) Y-K Delta residents are Yup'ik. Over 1,000 Athabaskan join the Yup'ik living in the upper Kuskokwim River villages. The Yup'ik and Athabaskan cultures are some of the oldest, most intact indigenous cultures in the world.

Figure 5 Camai Festival – Dancers (www.bethelarts.com)

The subsistence lifestyle, which includes hunting marine mammals, large game, and birds; collecting eggs; year round fishing; and picking berries is central to the region's economy. People travel to hunting areas and fish camps by skiffs and small boats on rivers and sloughs during the summer. In the winter, they use snow machines, especially for hunting, trapping, and ice fishing.

Within villages, most travel is by all-terrain vehicle (ATV) in the summer and snow machine in the winter. Many coastal and tundra villages use boardwalks over wetlands and soft tundra areas to accommodate ATVs that haul mail, water, sewage, and freight. In the larger villages, cars and trucks are a growing part of the vehicle fleet. Bethel, the region's hub community of 5,499, people has a vehicle fleet similar to most small towns in Alaska.

Figure 6 Quinhagak High School (DCED)

Bethel serves as the economic, commercial, transportation, and social center of the Y-K Delta. It has a modern airport, the region's hospital, and a 12-million gallon fuel storage facility that serves many Kuskokwim River villages. A distribution center and a major shopping center to serve the region are under construction. Depending on winter conditions, many villages near Bethel are linked by ice roads on the frozen rivers.

During the summer, barges bring fuel, construction materials, and large consumer goods to the region. Line-haul barges from Seattle and Anchorage work their way up the Kuskokwim River to Bethel. From Bethel, river barges bring fuel and goods to Kuskokwim River villages.

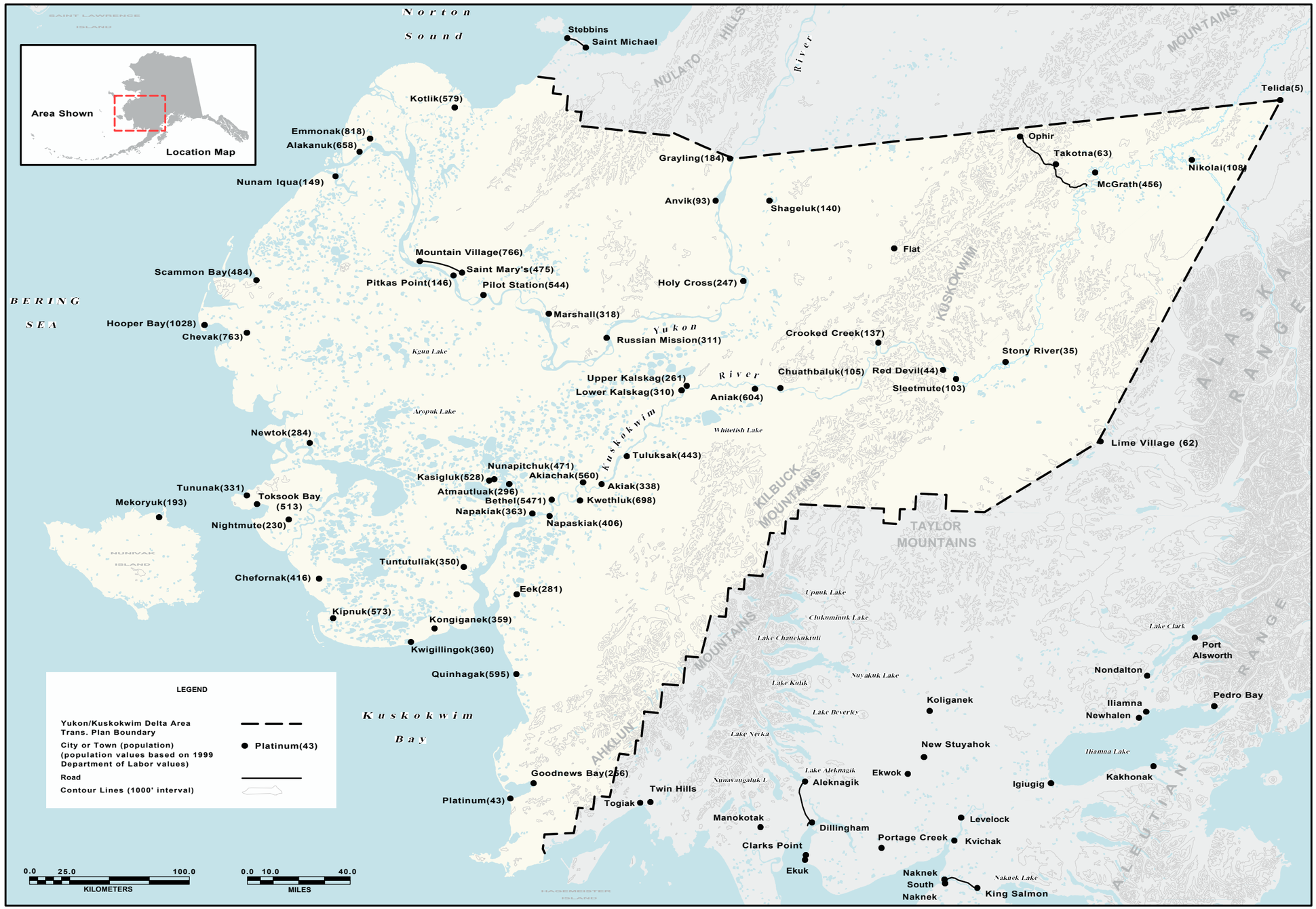

Figure 7 Y-K Delta Study Area

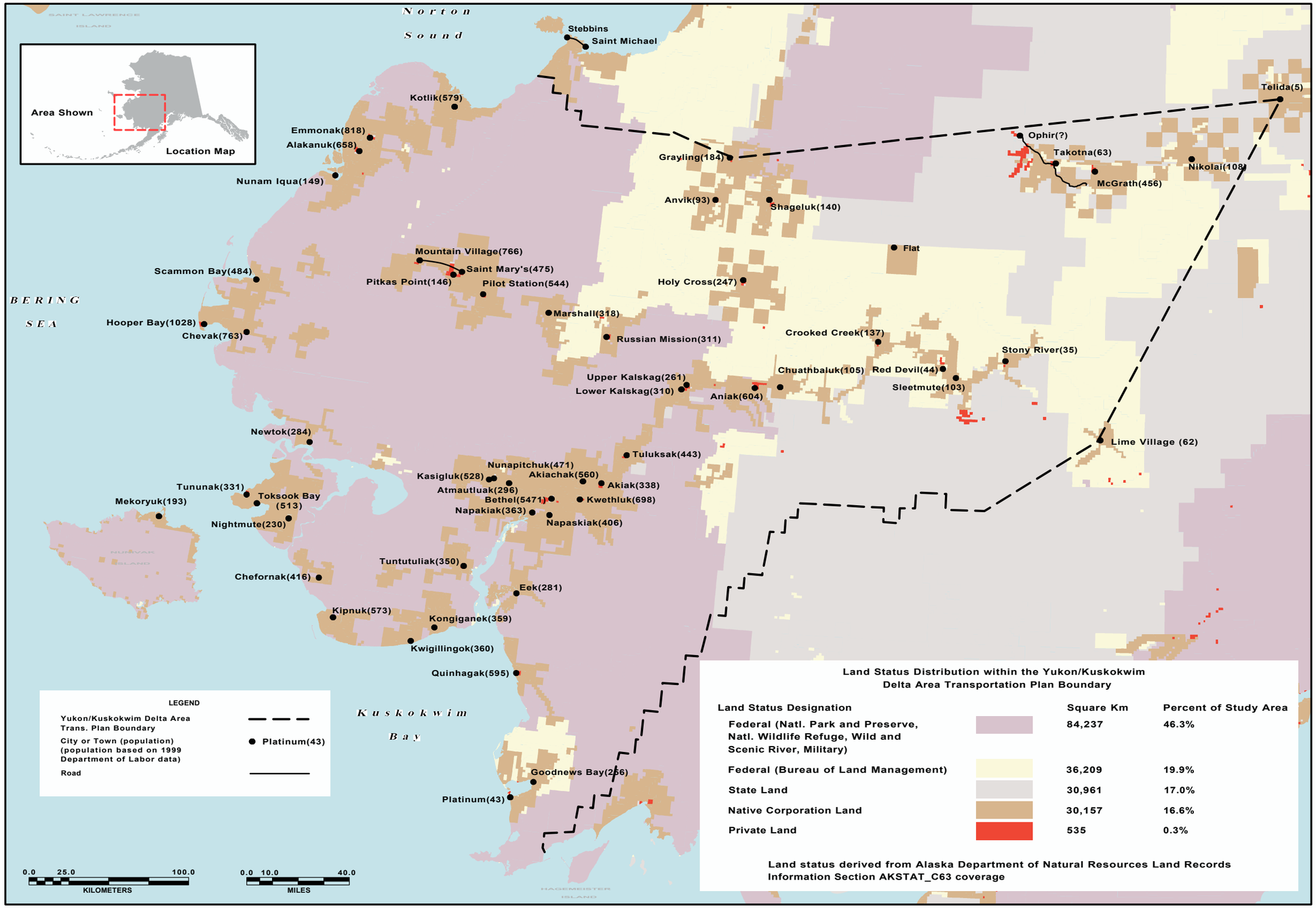

Figure 8 Y-K Delta Land Status

Figure 9 Bethel – Y-K Delta Hub (DCED)

Figure 10 Bethel's First Barge of Summer (DOT&PF)

Figure 11 Lightering Barge (DOT&PF)

Out on the coast, line-haul barges stand off the shallow coastal waters, loading shallow draft lightering barges that transport fuel and goods to individual villages. Line-haul barges also call at St. Michael, which then serves lower Yukon River villages with river barges. Barges from Nenana also supply Yukon River villages.

Bethel-based air carriers serve the 10 villages within 30 miles of Bethel and the 15 villages located along the Bering Sea coast. Over one-half of the 250,000 (1999) air passengers traveling annually in the region are taking trips to and from Bethel.

Smaller air hubs are at Aniak, Emmonak, St.Mary's, and McGrath. Aniak and McGrath serve upriver villages along the Kuskokwim and the midriver villages on the Yukon River from Russian Mission to Grayling. Emmonak and St. Mary's serve the villages along the lower Yukon River and villages as far south as Chevak on the coast.

In 1999, Bypass mail, a United States Postal Service (USPS) aviation-based fourth-class mail distribution system, delivered over 48 million pounds of food and consumer products to Y-K Delta villages. Figure 12 illustrates the system's hub and spoke route structure. Bypass mail is designed for orders of 1,000 pounds or more. Certified distributors in Anchorage combine orders for direct shipment to the region's postal hubs. At hubs, air carriers break down the pallets for transshipment to the smaller villages.

While the Bypass mail system is expensive to operate, it reflects the continuing commitment of the USPS to provide a consistent level of fourth-class mail service throughout the country. USPS efforts to streamline Bypass mail costs statewide include trucking fourth-class mail up the Dalton Highway to a Prudhoe Bay hub, where it is then flown to area villages, and hovercraft service to several villages near Bethel.

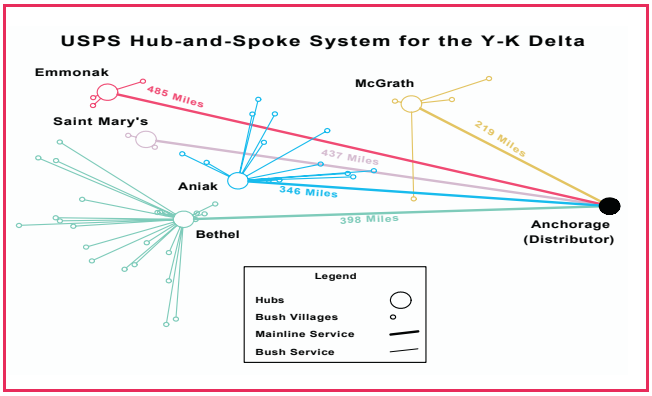

Figure 12 USPS Hub-and-Spoke System for the Y-K Delta

Figure 13 Bypass Mail Preparation at Denali Shippers in Anchorage (DOT&PF)

Figure 14 Bypass Mail Waiting for Transshipment at Emmonak Hub (DOT&PF)

Figure 15 Delivering Bypass Mail in Napakiak (DOT&PF)

Figure 16 Hovercraft Delivering Mail in Napakiak (DOT&PF)

The Focus of the Y-K Delta Plan

After analyzing the Region's transportation needs and opportunities, the planning team developed four major transportation infrastructure improvements that formed the basis of the regional transportation plan for the Y-K Delta.

- ***Airports*** upgraded with runways, lighting, and navigation capability to meet transport demands.
- ***Winter trails*** marking to make snow machine travel safer.
- ***Roads*** to provide the mineral rich upper Kuskokwim River region intermodal access to Yukon River barge operations and the 5,400-foot hub airport at McGrath.
- ***Barge moorings / Landing improvements*** at river villages to facilitate freight handling and fuel transfer.

1. Airports

The distances and challenging terrain between Y-K Delta population centers and the state highway system preclude highway construction as a major transportation strategy. Airport development is the plan's most important transportation issue.

In a region lacking highways, residents travel by plane five times more frequently per person than the national average. Aircraft are also the prime means to deliver goods (mail and cargo) normally delivered by truck in the rest of the country.

Although DOT&PF has committed significant funds to Alaska's rural airports in recent years, the Y-K Delta Plan's aviation system analysis illustrates the need to expedite completion of the region's airport network.

The plan's analysis found that despite progress on improving airports in the region, the smaller airports require single piston-driven engine aircraft like the Cessna 206/207 which are having a difficult time meeting the increasing demand for passenger and Bypass mail/air freight services. Aircraft accident rates have increased in recent years and are now significantly higher than those found throughout the rest of the country. The department's aviation system analyses showed that improved airport runways and runway lighting was urgently needed to improve air carrier operations, especially in the Y-K Delta. This was confirmed during the planning process by efforts undertaken by the Federal Aviation Administration (FAA) National Transportation Safety Board and the private insurance industry.

The FAA has recently initiated an experimental GPS-based air navigation system called "Capstone" that provides flight track recording, aircraft and ground avoidance capabilities, and instrument-grade landing capabilities for small aircraft. FAA chose the Y-K Delta for their initial tests. FAA and the National Weather Service also began working together on an accelerated effort to install sophisticated weather reporting devices for the region to reinforce the onboard "Capstone" equipment.

These improvements and capabilities in turn require that all airports meet basic standards for lower ceiling and approach minimums. It also requires runway-landing lights compatible with the new approach minimums and runway dimensions.

The department's analysis found that most village airports will function well in the short term with the Statewide Aviation Division's new 3,300-foot runway standards. However, modeling of demand and projections about aircraft needed to meet demand show that many airports in the region will need 4,000-foot runways over the next twenty years. Several upper Kuskokwim River villages need 4,000-foot runways now to receive airborne fuel deliveries because barges are unable to consistently and cost-effectively deliver fuel.

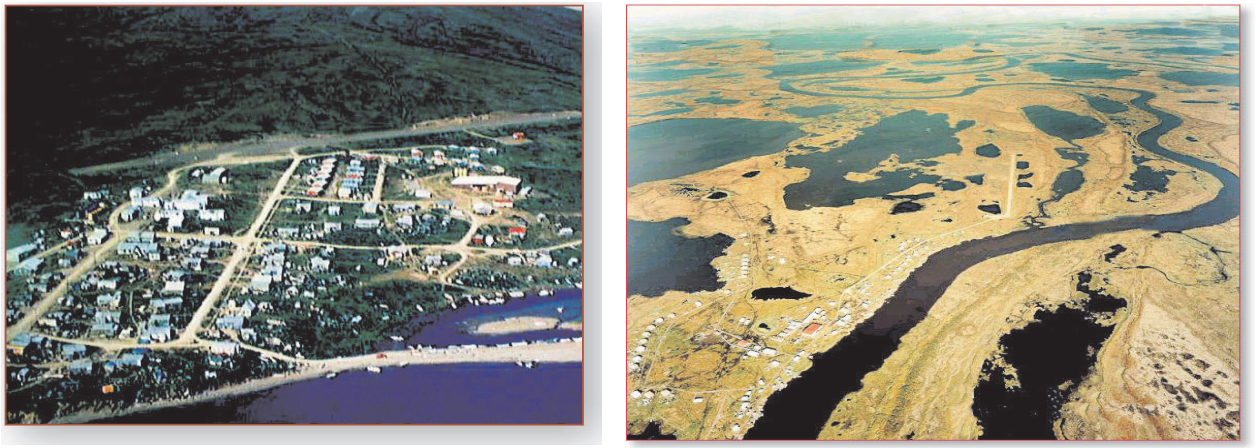

Figure 17 Toksook Bay (Airport in Back (DCED)) and Atmautluak (FAA, Alaska Region)

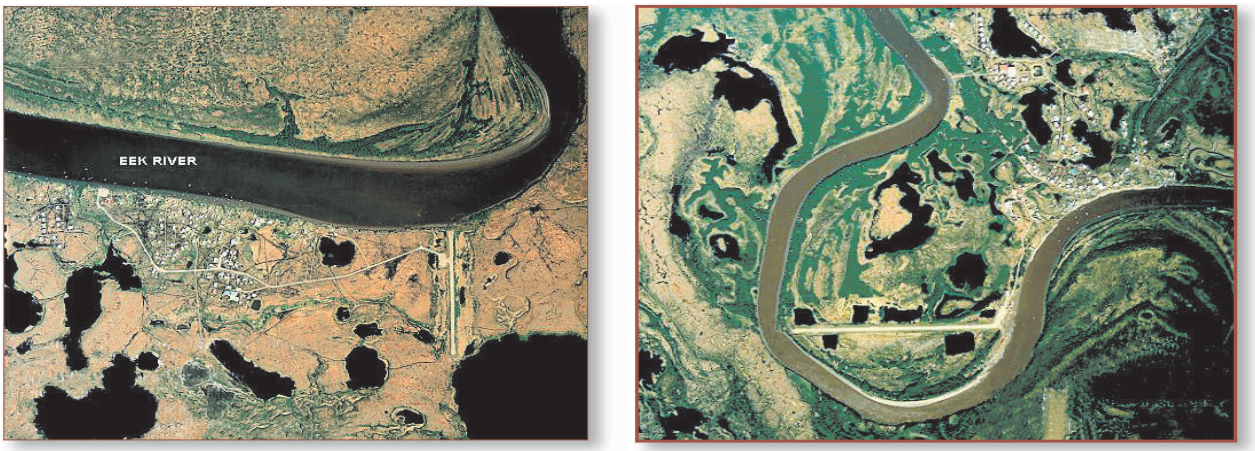

Figure 18 Example of Airports being Relocated – Eek and Tuntutuliak (FAA, Alaska Region)

Cessna 206/207s, DeHavilland Twin Otters, and Piper Navajos currently handle most small village air service. DC-6s, Beech 1900s, CASA 212s, Hercules C-130s, and other freight aircraft handle the large mail, fuel, and cargo loads in the region. The plan's analysis shows that the region's fleet evolution will include single turbine engine aircraft like the new Cessna Caravan and Grand Caravan for smaller villages and those villages close to the region's hubs. The larger villages in the region, and most out on the Bering Sea coast, will need twin turbine engine aircraft that require 4,000-foot runways.

These aircraft will become more readily available as Lower-48 state air carriers continue to move into larger turbine and jet commuter aircraft to meet demand in their markets. The aviation system analysis also found that insurance industry trends, pilot shortages, aviation gas availability, and other pressures are reinforcing the introduction of twin turbine aircraft into rural Alaska. The region's future aircraft fleet will consist of 9-, 19-, and possibly 30-passenger aircraft. DC-6, Beech 1900, CASA 212, Hercules C-130, and Bombardier/DeHavilland Dash 8 class aircraft will continue to bring heavy loads and fuel to the region for many years.

Figure 19 Present Regional Aircraft Fleet
Clockwise from Top Left: Cessna 207; Piper Navajo (Peninsula Airways); Twin Otter (ERA Aviation); DC-6 (Northern Air Cargo)

Figure 20 Emerging Regional Aircraft Fleet
Clockwise from Top Left: Grand Caravan (Peninsula Airways); Beech 1900 (Alaska Cargo Express); CASA 212 (Bering Air); SAAB 340 (Peninsula Airways); Dash-8 (ERA Aviation).

Figure 22 shows runway lengths needed for each village in the region within the plan's 20-year planning horizon. Table 1 (accompanying Figure 22) contains other data recommended for each airport. Projects beyond the 2005 timeframe and projects recommending runway lengths beyond 4,000 feet will be evaluated in individual Airport Layout Plans or Airport Master Plans to ensure that trends and conditions call for the runway dimensions and components predicted by the plan's aviation analysis.

Thirty airports require upgrading to meet state standards, at an estimated cost of $150 million; ten of these projects are already in the construction phase. Seventeen of the region's 53 airports will have to be extended or relocated before 2020 to permit 4,000- to 4,500-foot runways. This cost will likely exceed $140 million.

The plan identifies the need for small airport shelters for people and freight. The State is working with the villages, the Denali Commission,[1] and others to secure funding for shelters. A scenario for shelter construction and maintenance currently under consideration has DOT&PF providing a lease lot to the local community; the Denali Commission or other funding source providing the capital construction funds to the community; and the community then being responsible for the structure's maintenance.

New airports can improve maintenance and operations (M&O) costs over existing airport costs by providing better runway surfaces and better drainage systems that keep moisture from eroding and subsiding runway surfaces and embankments. However, it is also recognized throughout DOT&PF that airport improvements are just as likely to increase M&O costs overall. In the current fiscal environment of budget cuts and increased demand for improved urban services, new rural airport costs put increased pressure on already strained M&O resources.

The planning team tried to quantify the projected M&O cost increases. What it found through conversations with Y-K Delta region airport contractors and maintenance supervisors was that when a new airport is constructed or an airport is extended, contract dollar values for maintaining the airport tend to remain constant. The constant-value contracts seem due in large part to the inability of DOT&PF to increase airport M&O budgets.

M&O costs may also increase if air carriers are successful in extending operating hours at airports to meet increased volumes of Bypass mail and air freight. The department will continue to be faced with significant M&O budget challenges throughout the state as it attempts to focus its attention on its basic statutory mission of inter-community transport.

1. The Denali Commission is a federal government organization developed to assist rural Alaska communities with basic health and transportation capital improvements. The commission is funded through an annual federal budget and is guided in its efforts by a federal-state executive board that oversees operations.

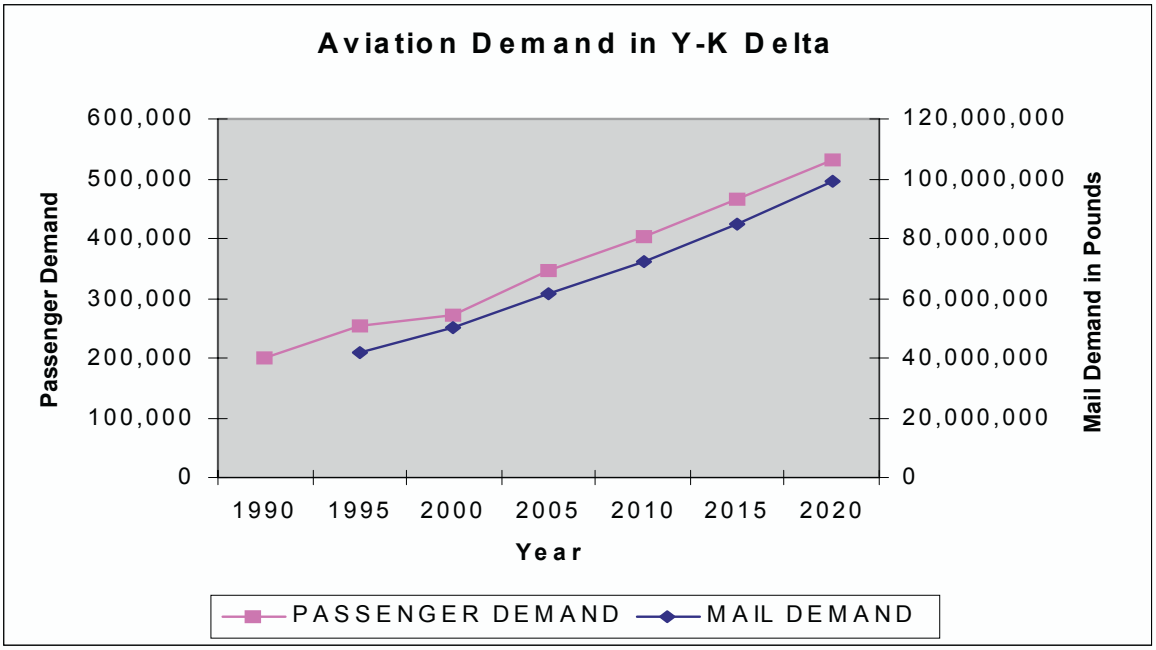

Figure 21 Aviation Passenger and Freight Forecast

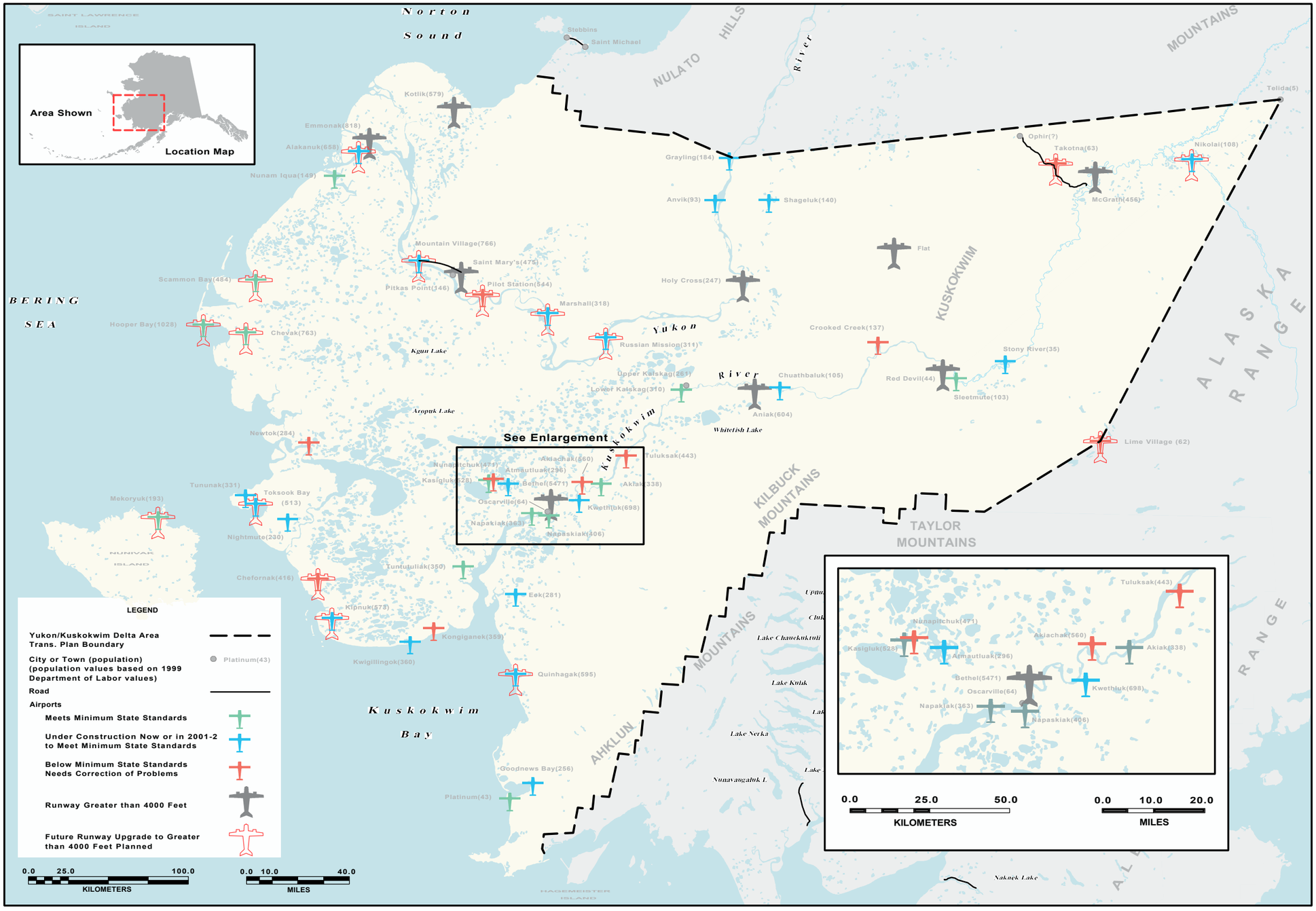

Figure 22 Airports and Recommendations (AK DOT&PF)

Village	1999 Pop. Est.	Appx Air Mlles to Hub	Present Runway Dimen.	Minimum Runway Dimen. Needed	Date Needed	Reason for Need	Project Status
BETHEL — (Hub)							
Bethel (Major Hub) (Incl Oscarville)	5,535	NA	6,398 x 150 Precision App.	OK	Continued Improvement	Regional Hub Airport	Master Plan Being Implemented
VILLAGES NEAR BETHEL — HUB (Bethel)							
Akiachak	560	14	1625 x 50	3300 x 60	ASAP	9 Passengers	Local Sponsor
Akiak	338	20	3200 x 60	3300 x 60	—	9 Passengers	Complete
Atmautluak	296	19	2000 x 40	3300 x 60	ASAP	9 Passengers	In Construction
Kasigluk	528	24	3200 x 60	3300 x 60	—	9 Passengers	Complete
Kwethluk	698	14	1700 x 40	3300 x 60	ASAP	9 Passengers	In Construction
Napakiak	363	12	3200 x 60	3300 x 60	—	9 Passengers	Complete
Napaskiak	406	6	3000 x 60	3300 x 60	—	9 Passengers	Complete
Nunapitchuk	471	23	2040 x 60	3300 x 60	ASAP	9 Passengers	Terrain Limits to 2500ft.
Oscarville	64	6	No Airport	Service from Napaskiak and Bethel			
Tuluksak	443	37	2500 x 30	3300 x 60	ASAP	9 Passengers	In Master Plan
ANIAK PLUS NEARBY VILLAGES ON KUSKOKWIM — HUB (Aniak)							
Aniak	604	0	6000 x 150	6000 x150	N/A	USPS Hub	Complete
Chuathbaluk	105	11	1560 x 60	3300 x 60	ASAP	9 Passengers	Construction 2003
Crooked Creek	137	47	2000 x 60	3300 x 60	ASAP	9 Passengers	Terrain Limits / Master Plan
Kalskag	571	26	3300 x 60	3300 x 60	—	9 Passengers	Complete
Red Devil	44	76	4750 x 74	4500 x 100	—	Fire / Resource	Complete
Sleetmute	103	82	3100 x 60	3300 x 60	—	9 Passengers	Complete
Stony River	35	100	2555 x 60	3300 x 60	ASAP	9 Passengers	Construction 2003
McGRATH PLUS NEARBY VILLAGES — HUB (McGrath)							
McGrath	423	0	5200 x 150	5200X150	—	USPS Hub	Complete
Takotna	48	14	1717 x 65	4000 x 75	ASAP	Fly Fuel	Relocate / Master Plan
Nikolai	105	46	2350 x 60	4000 x 75	—	Fly Fuel	Complete
Flat	12	77	4045 x 114	4000x 75	—	Fly Fuel	Complete
Lime Village	62	110	1475 x 60	4000 x 75	ASAP	Fly Fuel	In Master Plan
LOWER-MID YUKON SERVED BY ANIAK — HUB (Aniak)							
Anvik	93	77	2910 x 75	4000* x 60	ASAP	9 Passengers	Construction 2004
Grayling	184	95	2315 x 60	4000* x 60	ASAP	9 Passengers	Construction 2005
Holy Cross	247	40	4000 x 100	4000 x 100	—	19 Passengers	Complete
Russian Mission	311	60	2700 x 50	3600* X 75	—	9 Passengers	Complete
			3600 x 75	4000 x 100	2010	19 Passengers	Terrain Limit Investigation
Shageluk	140	76	2300 x 50	3600* x 60	ASAP	9 Passengers	In Construction to 3600 feet
LOWER-YUKON SERVED BY ST. MARY'S — HUB (St. Mary's or Bethel)							
Saint Mary's incl Pitkas Point	621	0 or 98	6003 x 150	6000 x 150	—	USPS Hub	Complete
Marshall	318	27 or 75	1940 x 30	4000* x 100	—	19 Passengers	Complete
Mountain Village	766	18 or 110	2500 x 60	3300 x 60	ASAP	9 Passengers	Construction 2004
			3300 x 60	3500 x 75	2005	19 Passengers	Terrain Limited
Pilot Station	544	12 or 87	2520 x 55	4000* x 75	2005	19 Passengers	Construction beyond 2005
UPPER COASTAL — HUB (Emmonak)							
Emmonak	818	0	4400 x 75	4400 x 100	—	USPS Hub	Complete
Alakanuk	658	8	2200 x 55	4000* x 75	ASAP	19 Passengers	In Construction
Nunam Iqua	149	21	3000 x 60	3300* x 60	—	9 Passenger	Complete
			3300 x 60	4000 x 75	2018	19 Passengers	New Master Plan Needed
Kotlik	579	34	4400 x 100	4000* x75	—	19 Passengers	Complete
MIDDLE COASTAL — HUB (Bethel)							
Hooper Bay	1028	151	3300 x 75	4400 x 100	2004	Future Hub	In Master Plan
Chevak	763	135	2600 x 40	3300 x 60	ASAP	9 Passengers	In Construction
			3300 x 60	4000 x 75	2015	19 Passengers	New Master Plan Needed
Scammon Bay	484	144	3000 x 75	3300 x 60	—	9 Passengers	Complete
			3300 x 60	4000 x 75	2015	19 Passengers	New Master Plan Needed
LOWER-MIDDLE COASTAL — HUB (Bethel)							
Chefornak**	416	90	2500 x 35	3300 x 60	ASAP	9 Passengers	In Construction
			3300 x 60	4000 x 75	2015	19 Passengers	New Master Plan Needed
Kipnuk**	573	96	2120 x 35	3300 x 60	ASAP	9 passengers	In Construction*
			3300 x 60	4000 x 75	2015	19 Passengers	Present Terrain Limit to 3300
Mekoryuk	193	150	3070 x 75	3300 x 100	—	9 Passengers	Complete
Newtok	284	95	2010 x 40	3300 x 60	ASAP	9 Passengers	On Hold
Nightmute	230	101	1600 x 40	3300 x 60	ASAP	9 Passengers	Construction 2003
Toksook Bay	513	112	1800 x 55	3300 x 60	ASAP	9 Passengers	In Construction
			3300 x 60	4400 x 100	2015	USPS/Cargo Hub?	New Master Plan Needed
Tununak	331	117	2010 x 40	3300 x 60	ASAP	A/P Capability	Construction 2004
KUSKOKWIM BAY & SOUTH COASTAL — Hub (Bethel)							
Eek**	281	40	1400 x 35	3300 x 60	ASAP	9 Passengers	In Construction
Kongiganak	359	76	1880 x 35	3300 x 60	ASAP	9 Passengers	Local Sponsor
Kwigillingok	360	78	2500 x 35	3300 x 60	ASAP	9 Passengers	Local Sponsor
Quinhagak	595	72	2600 x 60	3300 x 60	ASAP	9 Passengers	In Construction/Local Sponsor
			3300 x 60	4500 x 100	2010	Fish Haul	Local Sponsor
Tuntutuliak**	350	40	1800 x 28	3300 x 60	ASAP	9 Passengers	In Construction
Platinum	256	116	3640 x 60	3300 x60	—	Mining Transport	Complete
Goodnews Bay**	43	130	2850 x 80	3300 x 80	ASAP	9 Passengers	On Hold

Notes:
Although the State Standards are now 3300 feet runway length, all runways in excess of 3000 feet are shown as complete.
ALP is Airport Layout Plan
* Runways for villages served primarily by 9 passenger Navajo aircraft require longer than state standard.(minimum 3600, 4000 for safety)
** Airports being constructed in two stages. Stage one is soil preparation. Drainage usually takes 2-4 years before construction can be completed.

Table 1 Y-K Delta Airport Status Chart

2. Winter Trails

People throughout Alaska are increasing their use of faster and more reliable snow machines for winter travel. Village leaders and others speaking at public meetings during the planning process consistently asked DOT&PF to help improve winter trail safety. In the Y-K Delta, residents are traveling up to 300 miles for hunting, fishing, shopping, and to visit family and friends. From freeze-up in October until break-up in April/May, snow machine trails serve as the region's winter roads. The increase in overland travel and the distances traveled make trail marking essential.

A major element of the plan is a commitment to develop a winter trail marking system that improves safety. Figure 24 illustrates the approximately 900-mile network of major winter trails in the region. This map is the result of DOT&PF area planners and design teams working with villages to identify trails. Village leaders have also worked with staff to develop a standard marker (Figure 23) for trails. It is generally the case that village crews assemble and install the markers.

Reflectors, direction arrows, and other features, including special marking at rivers and lakes, and beacons at some of the open-country villages, are important elements of the trail marker system. The distance between markers will generally range from 200 to 500 feet depending on the terrain. In some coastal trail areas, trails will be moved inland to increase trail safety. In case of accidents or equipment breakdowns, travelers will be able to use a tripod marker and a cover carried on the snow machine to create a temporary shelter. The design for the markers is based on traditional driftwood markers from Bering Sea coastal villages. Because travelers are routinely using hand held Global Positioning System (GPS) navigation tools on the winter trails, the department is working to tie the trail markers to GPS coordinates.

The network is expected to be complete in five to eight years. The estimated cost for installing permanent trail marking ranges from $1,500 to $2,000 per mile. It will require $1.3 to $1.8 million of the department's ongoing Trail Marking capital program to complete the Y-K Delta winter trails marking project.

While the planning process was able to identify trails that qualify for permanent markers, a number of complications require that priority order of marking and final costs, be developed by DOT&PF design teams currently working on the trail marking program.

Complications include crossing National Wildlife Refuge lands and Native allotments, final route selections, agreements with villages for construction and maintenance, and other fiscal and land use issues. DOT&PF design teams are working aggressively to meet this known priority along those routes that can be quickly approved while continuing to work with land managers, villages, and others to approve and develop the more complex trails.

Figure 23 Trail Marker Tripod (DOT&PF); Hand-Held GPS Receiver (Garmin e-Trax website)

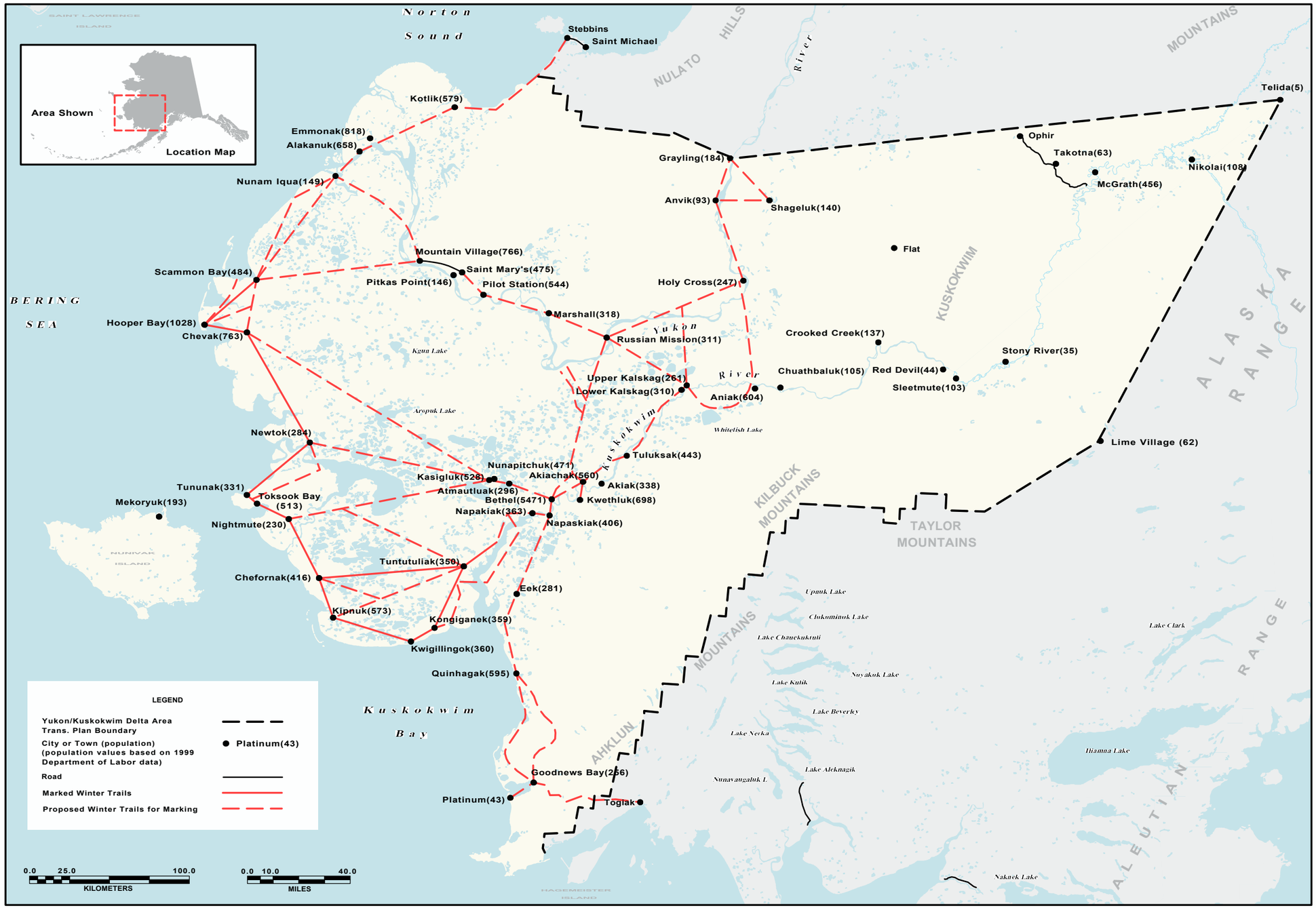

Figure 24 Winter Trails

3. Roads

An important planning task was looking at the concept of connecting some Y-K Delta villages that are close to one another by roads. The goal was to see if roads would reduce state M&O costs by consolidating public facilities including airports, health clinics, and schools in hub villages.

Coastal and Tundra Village Roads

The team found that constructing new roads in the Y-K Delta's coastal and tundra sections is not cost effective. Despite the short distances between some villages, the area's prevailing wetland/permafrost soils, frequent need for structures, high mobilization costs for contractors, and absence of gravel sources combine to create construction costs that range from $2.5 to $4.0 million per mile using a recent design report for the Napakiak to Bethel cost estimates as a base model. Given the small populations in the villages and the alternate transportation modes available, these construction costs do not compare well to the service provided.

M&O costs are also high compared to other regions of the state because of the area's relatively warm permafrost, pervasive drainage problems, and the high cost of importing gravel to maintain roadway surfaces.

The planning team did find that repairing the existing St. Mary's to Mountain Village Road on the lower Yukon River, a project currently under consideration, is a cost effective project. A similar road between Upper and Lower Kalskag on the Kuskokwim River is currently serviceable, but requires substantial maintenance effort.

The coastal village of Toksook Bay requested roads to Tununak and Nightmute on Nelson Island. Akiachak and Napakiak requested roads to Bethel. None of these roads appear to lower the cost of living for villages but would increase M&O costs for the department. Other road requests received during the planning process included a Russian Mission road to State and Village Corporation mineral lands. Table 2 details four of the road requests.

Equally important, most villages in this area expressed reservations about new roads to connect villages. Concerns included:

- A reluctance to forego village clinics, schools, or local airports in favor of consolidated facilities at a hub village
- Wider access to local subsistence resources
- The cost to develop car and truck fleets for transporting people and goods between villages

Due to road construction costs and community preferences, aircraft, snow machines, boats, and barges will continue to be the primary inter-village modes of transport in the coastal and tundra portions of the Y-K Delta.

Table 2 New Roads Requested in the Coastal Area of Y-K Delta

City Pair	Distance	Planning Estimate	Advantages	Disadvantages
Bethel to Napakiak (Reconnaissance study done)	12 mi.	$24M	Provides more convenient access to Bethel amenities.	Sufficiently far from Bethel that joint services are not likely. Significant wetland and river construction constraints.
Nunivak Island from North to South	50 mi.	N/A	Access to major fishing grounds on south side of island. Terrain is good for road construction.	Crosses through the middle of National Wildlife Refuge, including substantial portions of wilderness area.
Tununak to Toksook Bay	8 mi.	$12 M based on Napakiak and other road studies	Reasonable terrain, land owned by the two village corporations, connecting villages of 330 and 500. Possible consolidation of airport facilities, schools, health care, and other services now done separately.	Tununak wants to keep airstrip. No vehicles to use road.
Akiachak to Bethel	14 mi.	$25+M based on Napakiak study	Strongly urged by the local village council. Provides access that is more convenient to Bethel.	Sufficiently far that joint service is not likely. Significant wetland and river construction constraints.

Inland Resource Roads

In contrast to the coastal and tundra areas, the inland, rolling hills portion of the planning area does have suitable terrain and soils for standard road construction. The planning team found that a long-term project to build a road that accesses area minerals and completes the Ruby-to-McGrath link in the western end of the world-class Tintina Gold Belt district (Figure 26) could significantly contribute to the entire region's economic development.

Figure 25 Road Grading (DOT&PF)

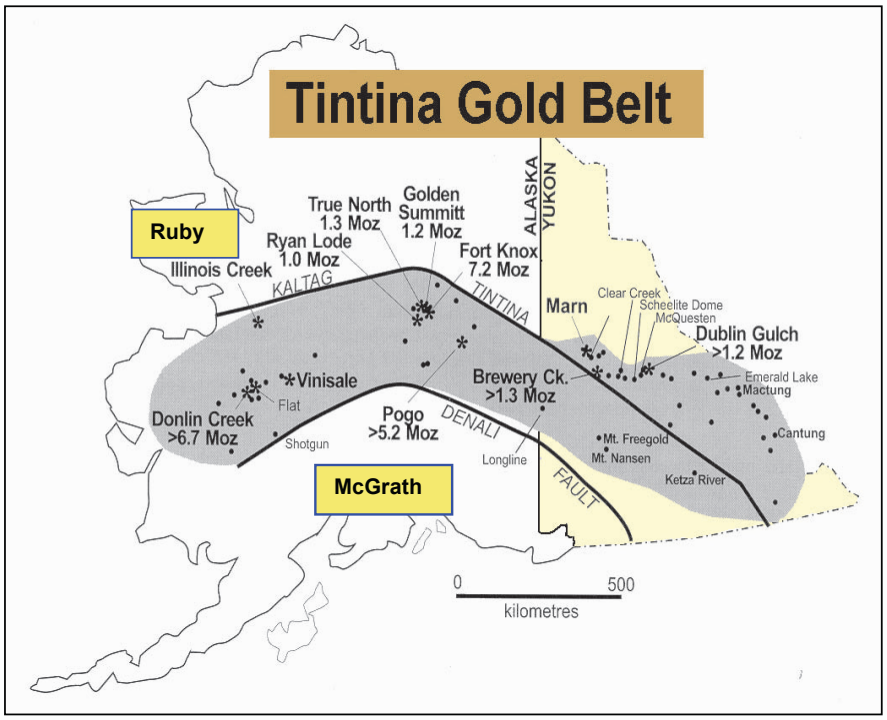

Figure 26 Mineral Resource Rich Deposits (Moz = Million ounces)

The U.S. Army Corps of Engineers (USACE) noted in their 1997 study of the Kuskokwim River that the upper reaches of the river beyond Crooked Creek are fraught with navigation problems and limitations. Their report states:

> …companies presently using the river to transport waterborne commerce are experiencing high operating costs due to the inability to operate at full capacity, delays caused by shallow water crossings and inability to access off- loading areas near enough to destination villages… it is apparent that deepening the shallow-water crossing would produce significant economic benefits: however those benefits would not likely exceed the costs.[2]

Segments of the Ruby-to-McGrath Road, south from Ruby on the Yukon River and north from Sterling Landing on the Kuskokwim River, were constructed in the 1930s, but work was halted during World War II. The project has been examined as recently as 1993 in the Ruby-to-McGrath Road Feasibility Study[3] prepared for the City of Ruby. That study estimated construction costs at $220-240 million for a direct route between Ruby and McGrath. The proposal outlined in this plan includes access to mineral deposits at Reef Ridge and Donlin Creek. These elements add costs to the estimate prepared by Manley Land Surveyors. Those costs and a review of the direct link costs are being evaluated

2. U.S. Army Corps of Engineers, *Expedited Reconnaissance Report and GIS Database - Kuskokwim River*, Alaska District, September 1997.
3. Manley Land Surveyors, Inc. *Ruby-to-McGrath Road Feasibility Study*, 1993.

in the department's Northwest Alaska Transportation Plan currently underway.

Informal discussions with communities along the route reveal strong community support for completing the road. Mine owners in the district indicate opportunities for public/private construction-stage partnerships and road maintenance agreements, two compelling ingredients in today's highway construction financing environment.

Project elements, listed in likely order of development include:

- Rehabilitate 54-mile federal-aid route from Ruby on the Yukon River south to Poorman
- Construct a 40- to 50-mile road to the Reef Ridge zinc mine southeast of Poorman
- Construct a 75- to 90-mile road between Poorman and Ophir
- Construct a 60-mile segment from Ophir to the Donlin Creek mining district
- Rehabilitate 38-mile federal-aid route from Sterling Landing on the Kuskokwim River north to Ophir
- Construct a 12- to 18-mile segment to McGrath

Figure 27 Core Drilling for Gold, Fred Creek (Alaska Mineral Industry Report 1999)

Figure 28 Pogo Mine Entrance (Alaska Mineral Industry Report 1999)

This road would initially provide mining operations with an intermodal connection to the Yukon River, the only navigable water capable of transporting products in to develop the region, and transporting ore concentrates and other products out of the region. The road, in its final stage, would also provide an intermodal connection to McGrath's 5,400-foot hub airport that would serve the area's community, commercial, and industrial aviation transport needs. The road would tend to focus transport of fuel and commercial products out of Fairbanks, helping to diversify and expand the Fairbanks-area economy.

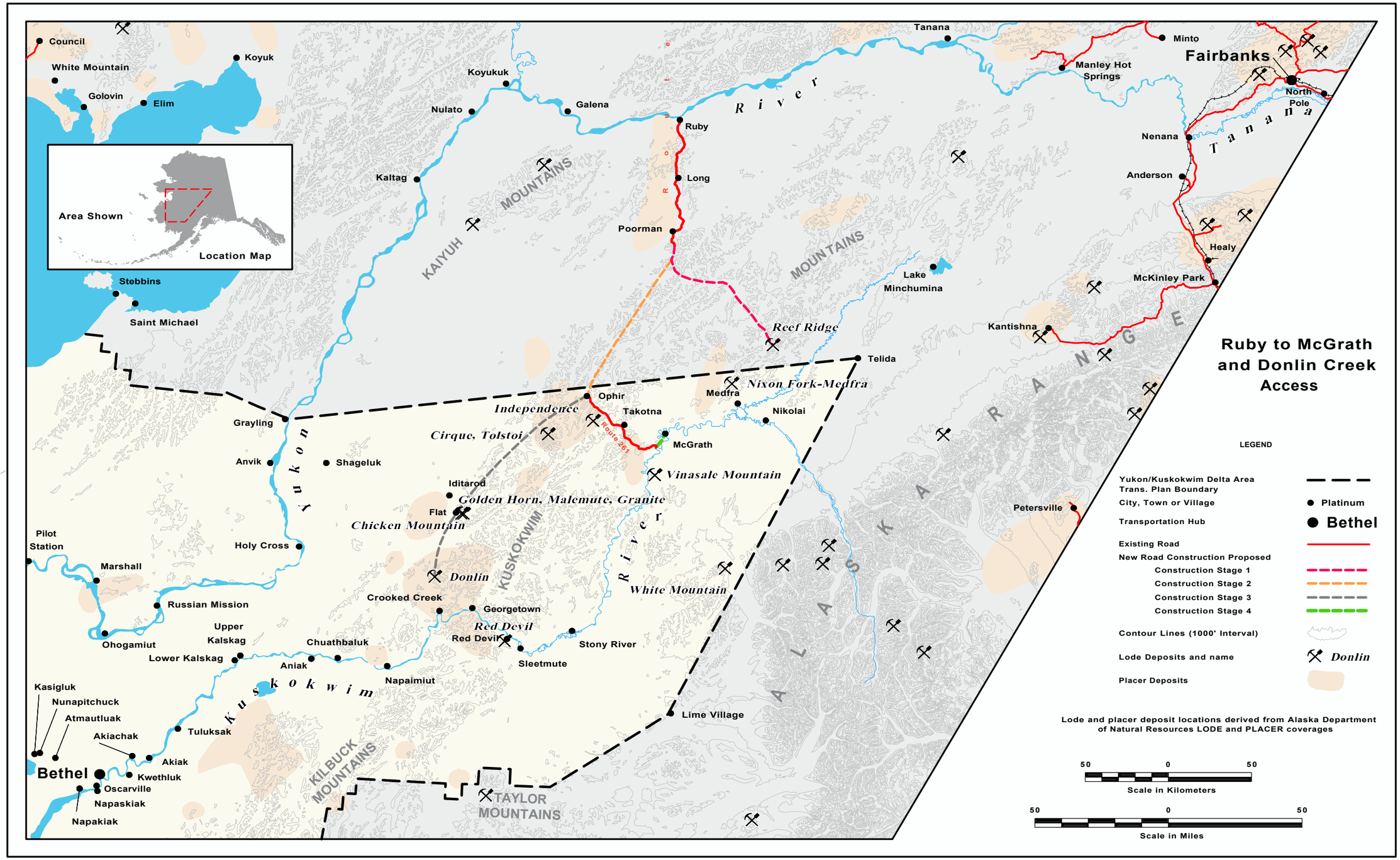

Figure 29 Ruby / McGrath Road

Figure 30 McGrath Airport – One Intermodal Connection Point (DOT&PF)

The Ruby-to-McGrath Road is an important element in the region's shift from a salmon-fishing-based economy to a more diverse economy that focuses on halibut/crab fisheries along the coast and mining developments in the region's upper reaches. The road may also support a long-term proposal for a coal-fired power generation plant and electric distribution lines to villages and mine sites in the district. Road construction and the mine developments that follow present a strong opportunity for workforce development in the region.

DOT&PF has transferred this proposal to the adjacent Northwest Alaska Transportation Plan that will define routes, quantify construction and maintenance costs, investigate partnership opportunities, and illustrate economic and social benefits the road would provide. The evaluation will include a new round of meetings in communities along both the Yukon and Kuskokwim Rivers to confirm that the public continues to support the project.

Figure 31 Village of Ruby and the Road to Poorman (FAA, Alaska Region)

4. Bering Sea Port

Bethel is the Y-K Delta's only deep-water port. Line-haul barges that follow the Bering Sea ice edge north along the coast each summer serve the Bering Sea coast villages. These barges have to stand several miles offshore and unload onto shallow draft lightering barges for delivery to shore. Some barge operators and the community of Mekoryuk on Nunivak Island proposed that a subregional port would improve line-haul barge operations and would allow shallow draft barges to serve coastal villages more efficiently.

In addition, the new nearshore crab and halibut fisheries, managed and promoted by multi-village Community Development Quota (CDQ) fishing organizations, would benefit from an improved harbor and fish

transfer dock that could be developed in conjunction with a subregional port.

DOT&PF, Coastal Villages Region Fund (the local CDQ organization), and USACE agreed to fund a subregional port study. The USACE study examined port development sites along the Bering Sea coast, including Nunivak Island, and investigated a new port's economic potential.

USACE found that there is insufficient fuel and freight movement along the coast to warrant construction of a federally-funded port facility. Further analysis of harbor and fish transfer facilities is being considered. The conclusions of the study reinforce the difficulties of major navigation and port development projects in this region of small populations and challenging construction.

5. Barge Moorings and Landings

The region's rivers provide barges with access to deliver fuel, heavy goods, and construction materials to most villages. Each village depends on summer delivery of a year's fuel for its heating, electric power, and transportation needs. To load and unload, barges must be held against transfer sites by river tugs. This results in river bottom and bank erosion and a potential for oil spills. In addition, village barge landings themselves are generally unimproved contributing to freight handling difficulties that increase costs. Building a mooring system, or barge face and gravel pad, at each landing would improve barge operations and provide a site for fuel transfer headers. This plan identifies short- and long-term approaches to address the lack of barge moorings. DOT&PF is working with the Denali Commission and others to identify funding for these projects.

The projects may meet the Commission's mandate for local-level capital projects that enhance quality of life in rural Alaska. DOT&PF staff are working with the barge operators and the villages to define projects for consideration by funding agencies.

Figure 32 Barge Unloading in Quinhagak (DOT&PF)

Conclusion

The Y-K Delta region presents significant transportation challenges to DOT&PF. The large coastal villages have many needs. The lack of roads and cost-effective road building opportunities puts pressure on the region's other modes of transportation. With its growing population and increasing use of consumer products as well as traditional resources, the people of the Y-K Delta are placing ever greater demands on the existing transportation infrastructure.

Practical ways that DOT&PF can improve the existing transport systems are upgrading airports to improve safety and meet future demand, and marking winter trails to improve traveler safety. This plan lays out a commitment to those improvements.

In the upper Kuskokwim River/Yukon River area, new road construction to the Reef Ridge and Donlin Creek mine site destinations and eventually to the upper Kuskokwim community of McGrath may generate significant economic and social benefits. This area, despite its mineral potential, is effectively closed to large-scale mining by a lack of transportation infrastructure. A road network that provides access for these mines to Yukon River barges and eventually the McGrath hub airport appears to be the key to a more diverse, stable economy in Western Alaska.

DOT&PF is committed to an analysis that illustrates construction and maintenance costs, investigates cost-sharing opportunities, determines timing and feasibility of constructing access, and outlines the economic and social benefits that would result from the project.

Building harbor facilities and a fish transfer dock at Mekoryuk and/or other Bering Sea villages is a project that needs further consideration as it appears likely these improvements would be important to the region's growing crab/halibut commercial fisheries.

Finally, the department is supporting efforts to develop barge moorings and landings for river villages by working with villages and the region's barge operators to identify projects that will enhance safety, improve product delivery, and expedite handling.

DOT&PF will continue to work with the Denali Commission and other funding agencies on the barge operation improvements.